Supporting Information

Bismuth Oxide: A New Lithium-Ion Battery Anode

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Control experiment details:

In order to determine whether there is NiO on the surface of Ni foam, we did two control experiments: one is that we immersed the Ni foam in the polymer solution (EDTA+PEI in DI H_2O) without the addition of bismuth nitrate hydrate, then heated, sonicated, and dried it in the same procedure; the other one is that we directly heated the Ni foam in the furnace in air under the same temperature program. We measured the weight of both of them before and after the whole procedure, and found out that the ones immersed in the polymer solution had negligible weight increased, while the ones heated in air without immersing in solution had obvious weight addition, which are shown in Table S1. This can be explained that the Ni foam immersed in the polymer solution cannot directly contact with air and was very limited oxidized.

Table S1. Weight addition on Ni foam in two control experiments

Sample / Condition	#1	#2	#3	#4	#5	#6	#7	#8	Ave. (mg)
In polymer solution	0	0.02	0.02	0	0.03	0	0	0	0.009
Without solution	0.20	0.22	0.21	0.18	0.19	0.21	0.21	0.20	0.203

Furthermore, we tested the cycle performance on the samples heated in air directly without immersing in the solution at a current density of 100 mA/g. The testing weight was based on the active material, NiO, which can be calculated according to the weight additon. As shown in Fig. S1, this directly oxidized NiO didn't deliver a high specific capacity, and it only had a capacity of 260 mAh/g after 40 cycles.

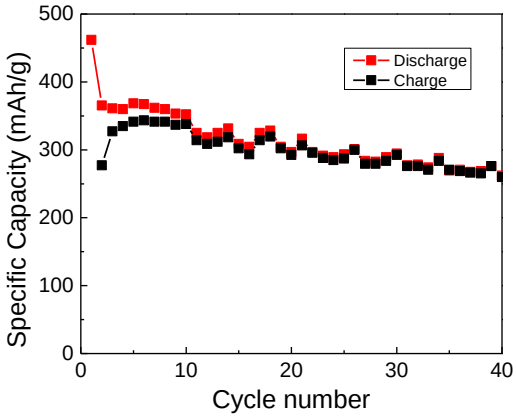

Fig. S1 Cycle performance of NiO (heated Ni foam directly in air).

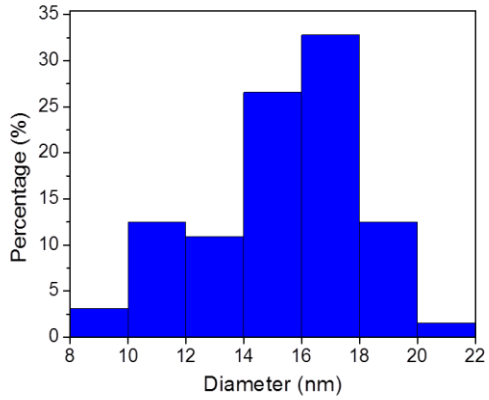

Fig. S2. Histogram of diameter distribution p- Bi_2O_3.

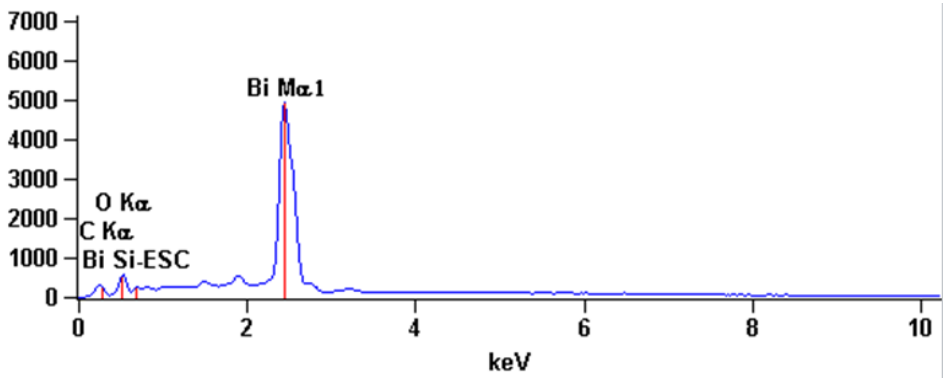

Fig. S3. EDS spectra of p-Bi_2O_3 powder.

Table S2. Element contents in the p-Bi_2O_3 powder.

Element	**C**	**O**	**Bi**
Atom %	48.23	31.31	20.46
Weight %	10.82	9.36	79.82

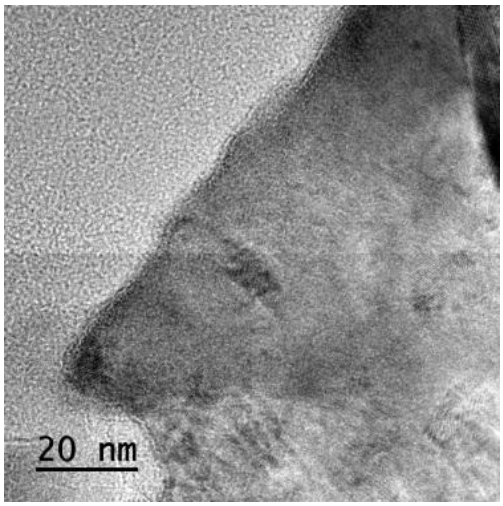

Fig. S4. TEM image of c- Bi_2O_3.

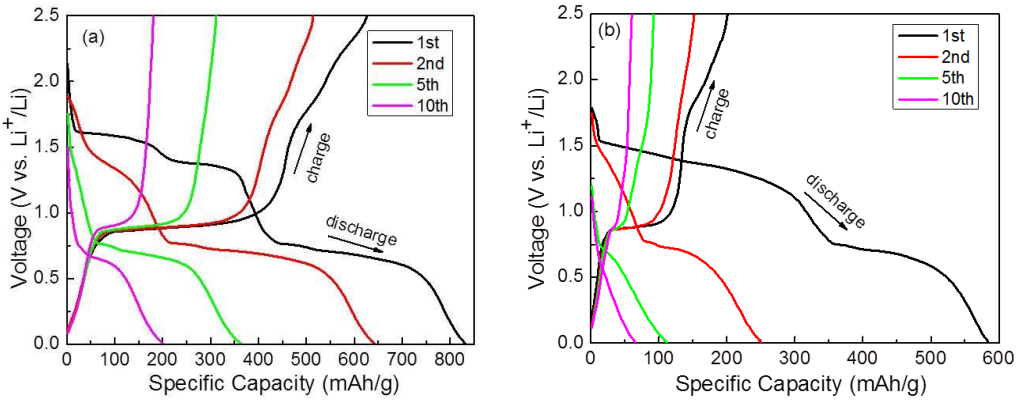

Fig. S5. Voltage profile of (a) p-Bi_2O_3 and (b) c-Bi_2O_3.

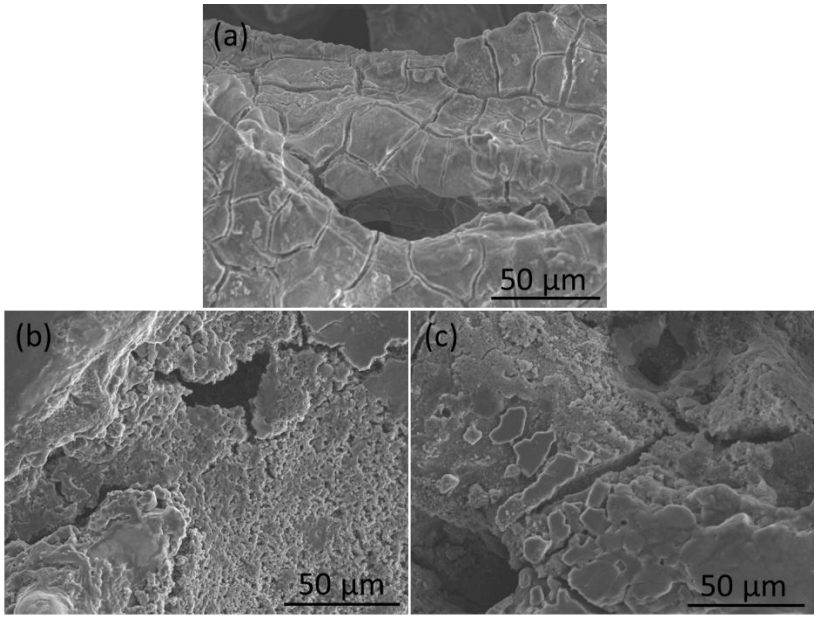

Fig. S6 SEM images for (a) p-Bi_2O_3/Ni (b) p-Bi_2O_3 (c) c-Bi_2O_3 electrode after 40 cycles at a current density of 100 mA/g.